

## ABSTRACT OF THE INVENTION

The present invention relates in general to the preparation and use of matrices having solid spaces, interstitial spaces and interstitial polymer networks. In particular, the interstitial polymer networks have utility in chemical and biochemical separations, solid phase synthesis, catalysis of chemical reactions, and immobilized enzyme reactors. The interstitial polymer networks in one embodiment comprise crosslinked polymers suspended in the interstitial spaces from and/or between solid particles. The matrices are characterized by high ligand and functional group density and by reversible high sorptive and binding capacity, and are substantially accompanied by a very low nonspecific adsorption or interaction with molecules such as proteins. Moreover, the matrices of the invention exhibit other characteristics highly desirable in chromatographic and catalytic applications, such as high physical rigidity, high ligand density, chemical stability, high ligand reactivity, and rapid exchange and reaction kinetics.